Critical Systems Overview

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Critical Systems

- For this presentation, we'll define "critical systems" as systems or services that have to be available 24/7.

- FEF tries to keep number of critical systems to a minimum to limit management effort and equipment expenses.

- We encourage customers to build resilient applications and services.

- At a large enough scale, all systems are critical.

- Some uptime requirements were defined in original D0/CDF Run2 MOUs, but documents are outdated.

FEF Critical System Deployments

- Network Appliance Filers
- Red Hat Clusters
- Virtual Iron Clusters
- Warm/Cold Server Spares

NetApp Filers

Network attached storage (NAS) serving important data via NFS

- Home directories
- Experiment code
- Web data

NetApp Filers

NetApp filers are used by

- CDF Online
- CDF Offline
- D0 Online
- D0 Offline

NetApp Filers

Pros and Cons

- Clustered heads with automatic failover
- Redundant power supplies
- High quality hardware with low failure rate
- 24/7 hardware and technical support
- VERY expensive

Red Hat Cluster

- Linux based clustering of services with automatic failover.
- Used by D0 Online only

Red Hat Cluster

Pros and Cons

- Very problematic
- Often requires reboot of all nodes in cluster to correct issues.
- No technical support
- Uses commodity hardware
- It’s free

Virtual Iron

- Xen based virtualization manager.
- New to FEF Dept.
- In production at CDF Online for web services and soon at D0 Offline.

Virtual Iron

Pro and Cons

- Automatic failure over of VMs
- Easy management via Java GUI
- Good technical support
- Inexpensive compared to VMWare
- Probably not well suited for heavily loaded services, e.g. CDF CAF head nodes

Warm/Cold Server Spares

- Involves moving service from failed Linux system to standby machine
- Normally failover is not an automatic process
- Less than ideal for truly critical systems
- Very common, used by all experiments
- Cheap to implement

Critical Systems by Customer

CDF Online

- b0home/b0spool: NetApp filer
- b0www00: Web server on Virtual Iron

Critical Systems by Customer

CDF Offline

- fcdffs01/02: NetApp filer
- fcdfcode3: Code server

Critical Systems by Customer

D0 Offline

- d0www: Web server, cold spare
- d0fs01/02: NetApp filer
- d0cabsrv1/2: CAB head nodes, cold spare

Critical Systems by Customer

D0 Online

- d0olfs01/2: NetApp filer
- Service Cluster: Red Hat Cluster
- Level 3 Cluster: Red Hat Cluster
- DAQ Cluster: Red Hat Cluster

Critical Systems by Customer

No critical systems

- MiniBoone
- EAG
- MIPP
- MINOS